

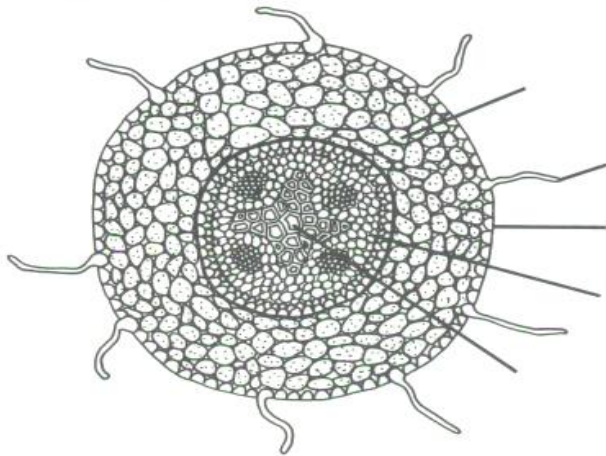


**Roots**

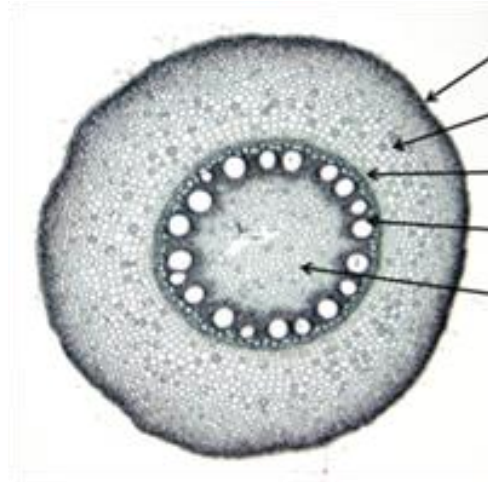
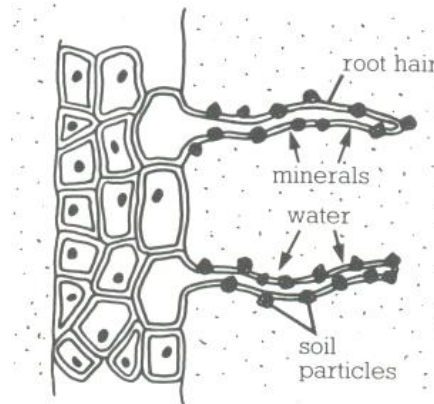
# Functions

- Anchor the plant in soil and prevents erosion
- Support the stem in an upright position
- Absorb water and minerals for photosynthesis
- Stores food as starch and water

*Cross section of a root*



*Close-up of a root*



Part	Function
Rootcap	Protective cap covering the apical meristems of most root tips which produces a slippery substance to help the root penetrate the soil.
Meristem	Produces new cells to increase the length of the root
Epidermis	Absorb water and nutrients
Root hairs	Dramatically increase the surface area of the epidermis. As a result, the root can absorb water and dissolved nutrients much more efficiently
Cortex	Store carbohydrates, and also help transport water from the epidermis to the xylem
Endodermis	Prevent substances from leaking back into the cortex.
Parenchyma	Involved in photosynthesis and the storage of nutrients, carbohydrates, and water.

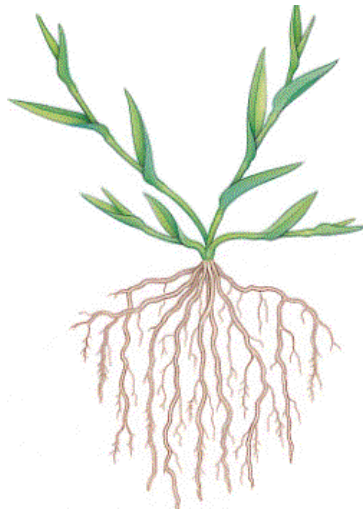
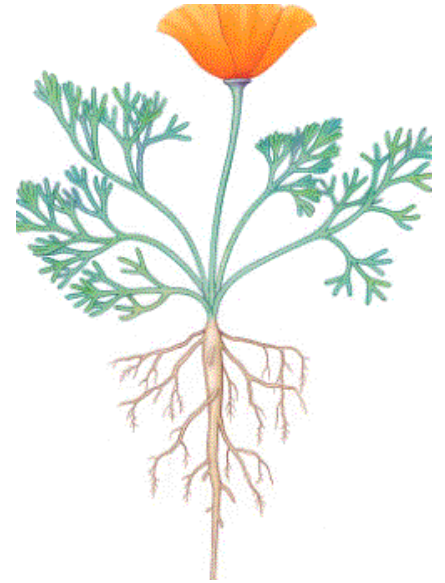
# Types of Roots



# Types of Roots

## 1. Tap Root

- Single large primary root that grows deep into soil
- Good for food storage
- Carrots, dandelions



## 1. Fibrous Root

- First root grows into many roots
- Absorbs water quickly
- Grasses, rye plant

# Transport – Roots, Stems and Leaves

## 1. Water and Nutrients

### In the Roots

- water enters by **osmosis** (since there is always less water in the root cells than the soil).
- dissolved nutrients enter by **active transport** since they move against the concentration gradient.
- Three processes contribute to the movement of xylem sap from the roots to the leaves:

**Active transport** – the transportation of materials through a cell membrane using energy from the cell.

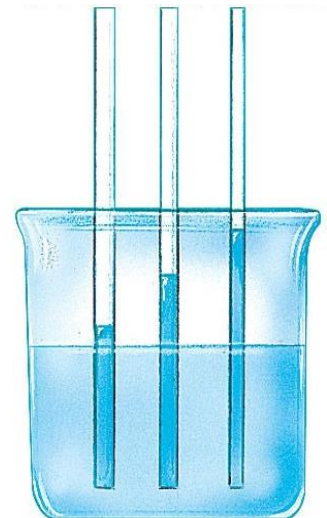
## In the Stem

- 1) **root pressure** – the force of water movement into the root ‘pushes’ xylem sap up.
- 2) **capillary action** – water molecules are attracted to the walls of the xylem (**adhesion**) and to each other (**cohesion**). Together, these two forces ‘pull’ water up the xylem tube.

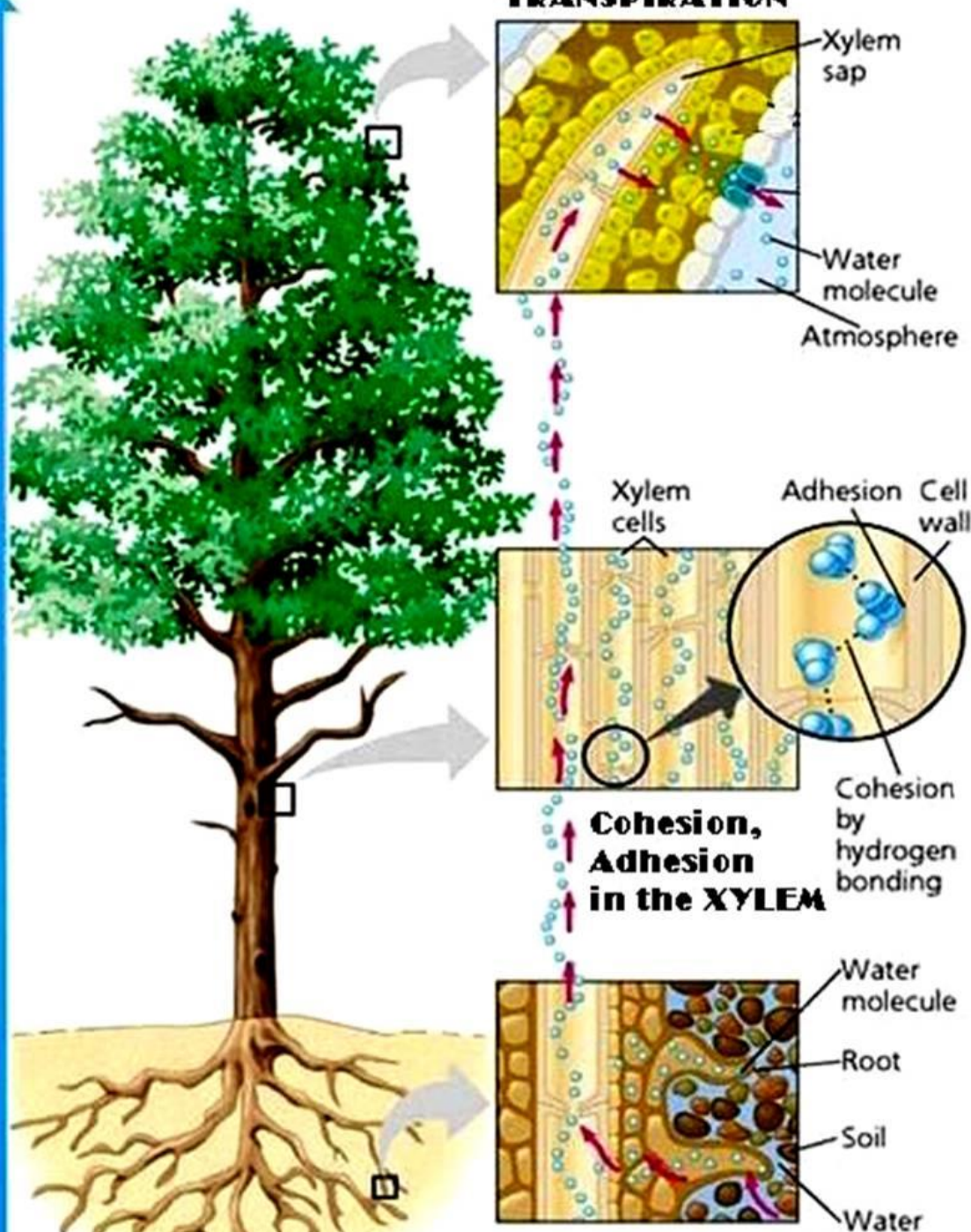
## In the Leaves

- 3) **transpiration** – water evaporates from the stomata of the leaf, as water leaves, it pulls the next water molecule into its place and all molecules move up the xylem column.

Capillary  
Action



**LONG DISTANCE WATER TRANSPORT**

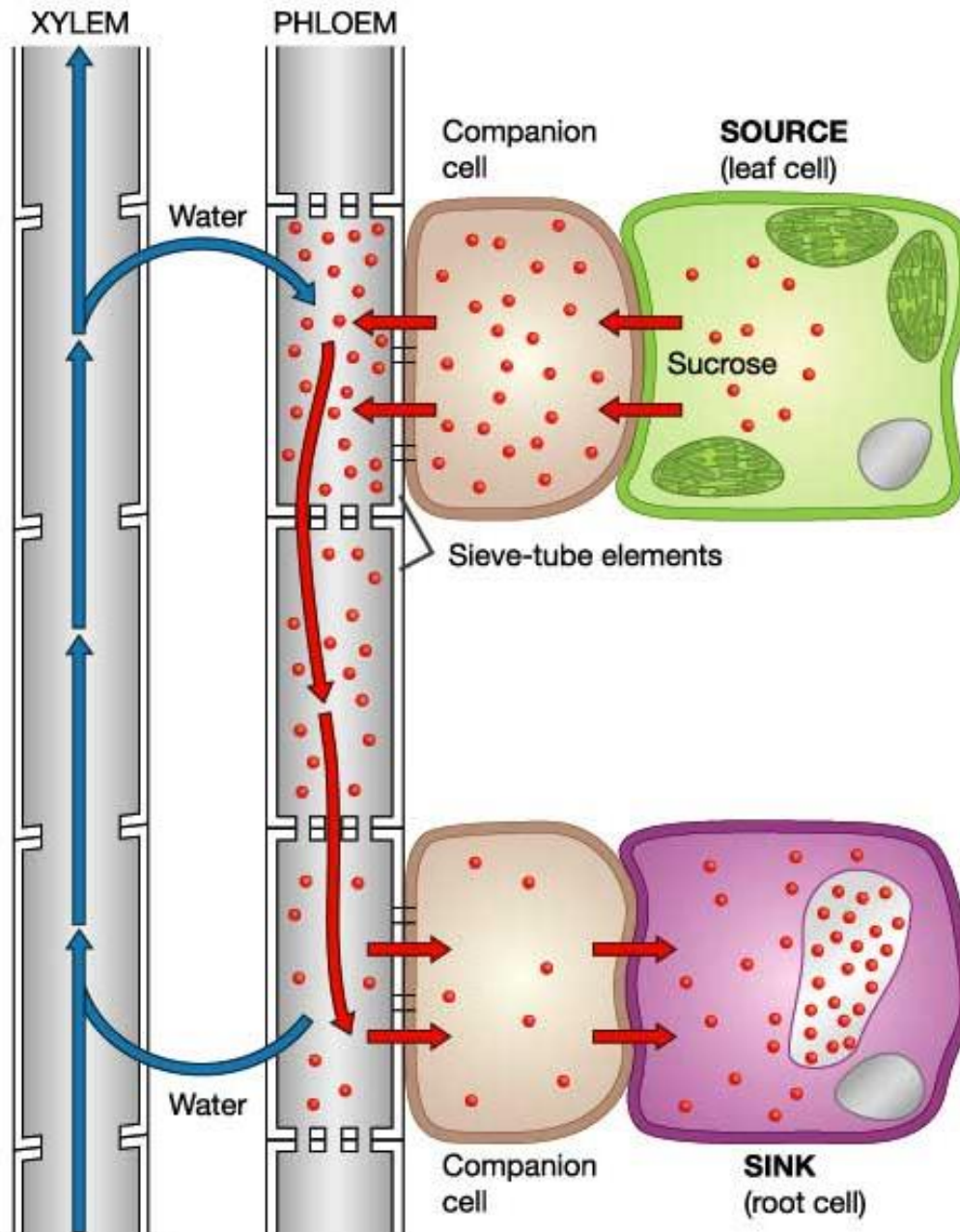


## 2. Sugars

- **Plants** – produce sugars by photosynthesis or from breaking down carbohydrates in storage organs, such as tubers (stems).

### **Movement**

- Sugar molecules move from a **source** (where its made) to a **sink** (low concentration) via phloem.
- Since the phloem has a higher conc. of sugar, sugar must move out of the source by **active transport**.
- In the sink, sugar leaves by **passive transport** as it moves to a cell with a low conc. of sugar.



# Root Adaptations

- Make notes on Root Adaptations. Page 514-515.
- Read p. 512 to 518
- Q. p. 516 # 1 to 5